TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION
U.S. DEPARTMENT OF AGRICULTURE · · FOREST SERVICE

No. 444

Progress of Top-Dying in Yellow Birch - Upper Michigan, 1954-1955

In late May and early June 1954, dying tops were observed in a high percentage of yellow birch trees in the Upper Peninsula of Michigan. The damage, occurring in both virgin and cutover stands, ranged from slight discoloration of the leaves to complete defoliation and death. These injuries closely resemble the reported symptoms of dieback among the birches of the eastern United States and Canada in recent years.

A series of observation plots was established in July 1954 on the Upper Peninsula Experimental Forest at Dukes, Michigan, to determine the extent and degree of injury. The same plots were re-examined in July 1955 to observe the progress of top injury.

Top-dying in the slightly injured and apparently healthy trees in 1954 developed at a relatively rapid rate during the following year, while the more severely injured trees tended to remain in the same injury class (table 1 on back of sheet). In most cases crown-dying progressed from the initially injured portion to the next larger twig or branch. Trees 15 inches and larger in diameter at breast height were the most seriously injured size class in the initial stage, and showed the highest rate of deterioration. Mortality was light, consisting of only two pole-size trees.

Although the data indicate a general crown deterioration in all stands, some trees in nearly all of the injury classes showed a trend toward recovery (table 2). The smaller trees appeared to be recovering more rapidly than the larger ones, with the rate of improvement being greater in the less severely injured classes. Crown deterioration tended to stabilize in the trees with moderate injury.

Permanent sample plot records show that dieback has occurred on individual yellow birch trees in the past without appreciable reduction in growth over 5-year periods. The injury may, however, be the entrance point for upper stem rot common in yellow birch. Cutover stands seemed to be more seriously affected than virgin stands, but the evidence was not conclusive. The initial cause of injury and the reason for its development remain unknown, although climatic factors, in conjunction with low vigor of individual trees, appear at the present time to have a strongly contributing influence.

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R. M. GODMAN, Research Forester.

Table 1.--Percent of trees showing top-dying within each diameter size-class, by injury class

1954 injury class	5-9 inches (96 trees)		10-14 inches (97 trees)		15 inches plus (115 trees)	
	1954	1955	1954	1955	1954	1955
None	51	43	40	22	17	10
Slight[1/]	19	11	39	36	44	18
Moderate[2/]	18	35	18	38	35	67
Severe[3/]	9	6	0	1	4	5
Dead	3	5	3	3	0	0
All	100	100	100	100	100	100

1/ Trees with abnormally small, curled or yellowish foliage, or partial defoliation of twigs,

2/ Trees with dead twigs or branches constituting less than one-half the crown.

3/ Trees with over one-half of the crown dead but with at least one trunk sprout.

Table 2.--Progress of top-dying, 1954-55

1954 injury class	D.b.h. in inches	Percent of trees which were--		Basis: No. of trees
		Improved	Deteriorated	
None	5-9	--	29	49
	10-14	--	59	39
	15+	--	55	20
Slight[1/]	5-9	28	56	18
	10-14	14	47	38
	15+	4	76	50
Moderate[2/]	5-9	12	23	17
	10-14	6	29	17
	15+	5	17	41
Severe[3/]	5-9	22	33	9
	10-14	--	--	0
	15+	--	--	4

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2/ Trees with dead twigs or branches constituting less than one-half the crown.

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